THE RESIDENCE OF THE PROPERTY OF THE PROPERTY

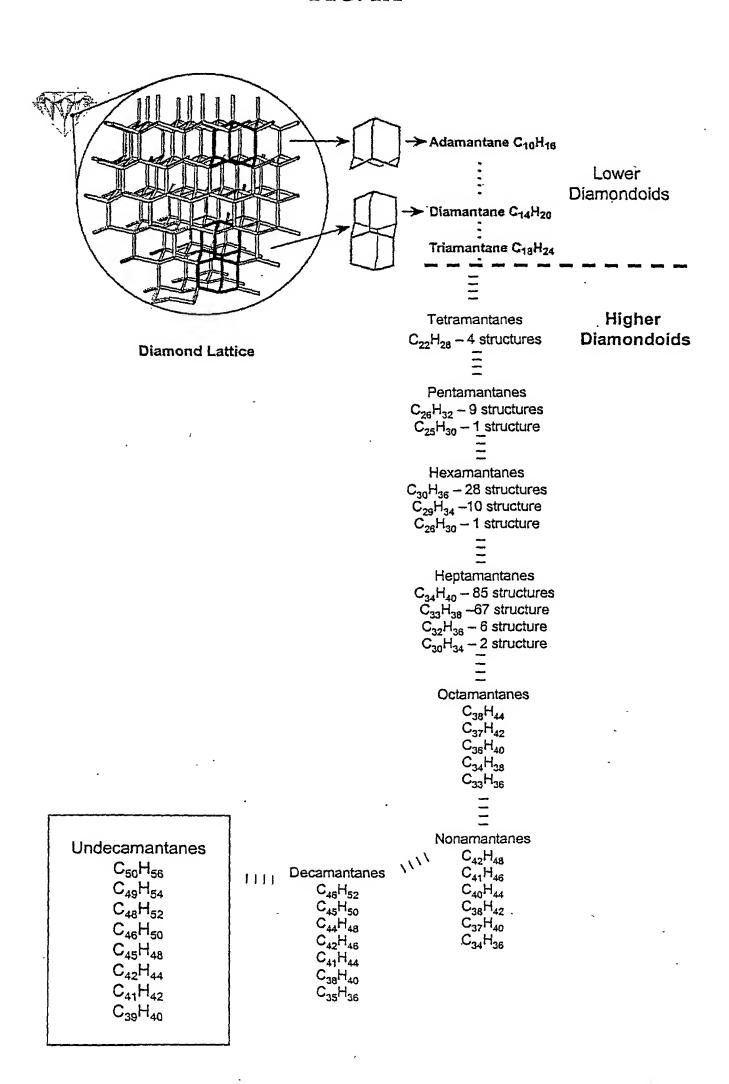
APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

'INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 1 of 59

### FIG. 1A



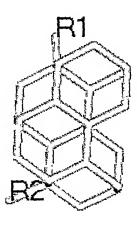
reit of the form o

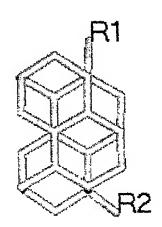
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

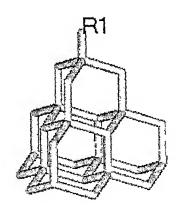
INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 2 of 59

FIG. 1B

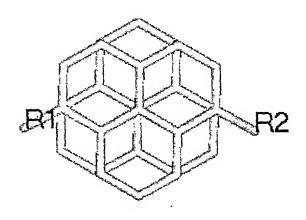




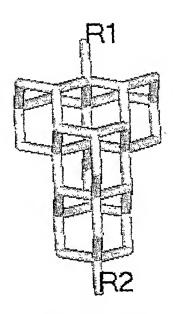


Enantiomeric [123] Tetramantanes

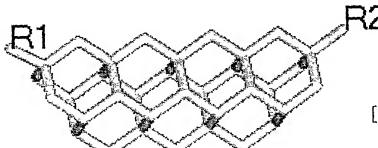
[1(2,3)4] Pentamantane



[12312] Hexamantane (Cyclohexamantane)



[121(3)4] Hexamantane



[121212] Heptamantanes

THE SECOND STATE OF THE PARTY O

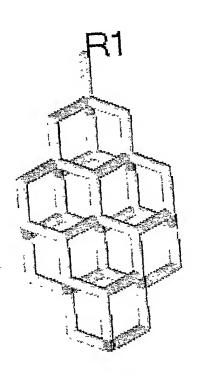
APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

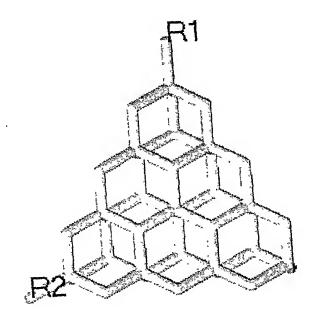
INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 3 of 59

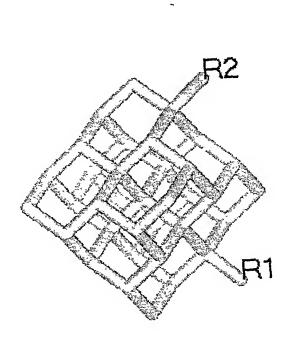
FIG. 1B (continued)



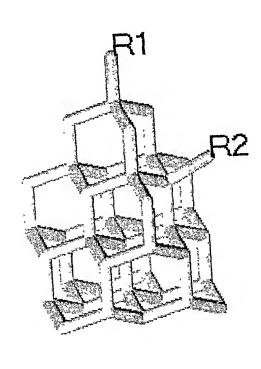
[1213(1)21] Octamantane



[121(2)32(1)3] Nonamantane



[1231241(2)3] Decamantane



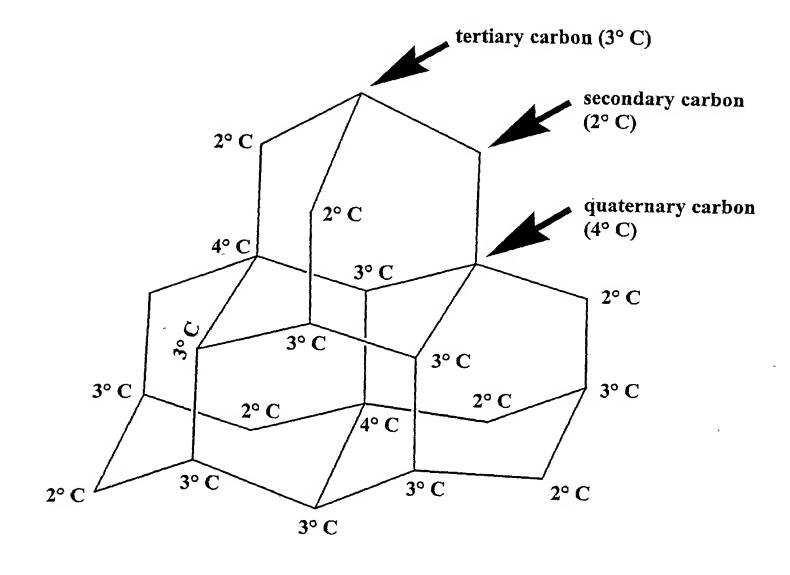
[123(1,2)42143] Undecamantane

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 4 of 59

FIG. 2A



F # (20)

The state of the s

\$1 \$142 \$342 \$342

į̃κį. 100

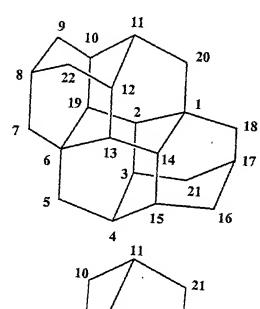
1

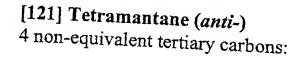
1

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 5 of 59

FIG. 2B



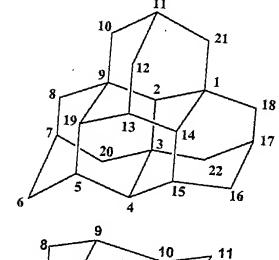


4, 11 (equivalent)

8, 17 (equivalent)

3, 10, 12, 15 (equivalent)

2, 13, 14, 19 (equivalent)



## [1[2]3] Tetramantane (iso-)

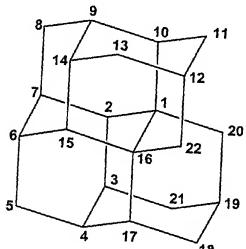
4 non-equivalent tertiary carbons:

2

4, 14, 19 (equivalent)

5, 13, 15 (equivalent)

7, 11, 17 (equivalent)



# [123]A Tetramantane (skew-A)

6 non-equivalent tertiary carbons:

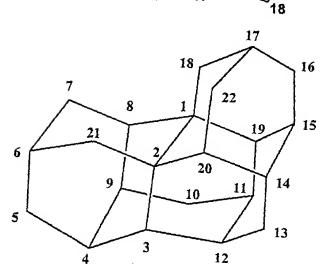
6, 7 (equivalent)

4, 9 (equivalent)

3, 14 (equivalent)

2, 15 (equivalent) 10, 17 (equivalent)

12, 19 (equivalent)



# [123]B Tetramantane (skew-B)

6 non-equivalent tertiary carbons:

6, 17 (equivalent)

4, 15 (equivalent)

11, 12 (equivalent)

3, 19 (equivalent)

9, 14 (equivalent) 8, 20 (equivalent)

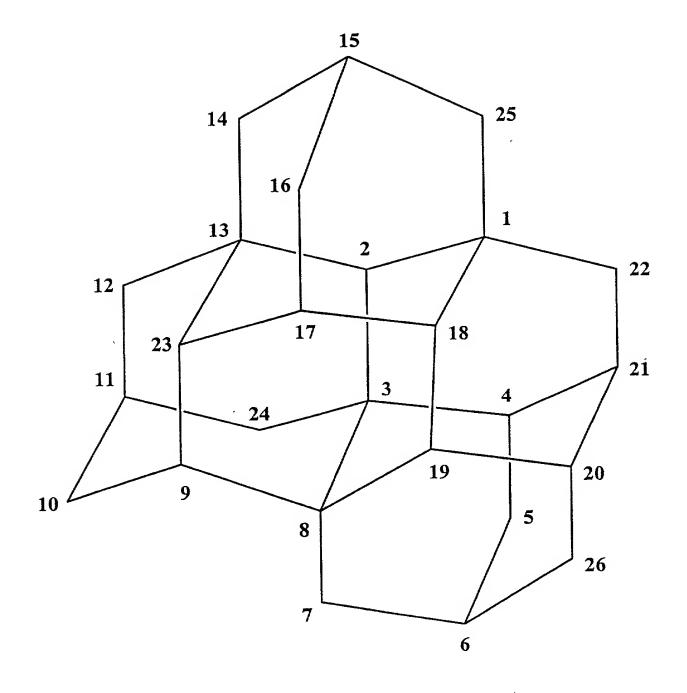
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 6 of 59

FIG. 2C

#### Pentamantane



marke the first the second sec ill though suffer . 2518: to distribute the state of the

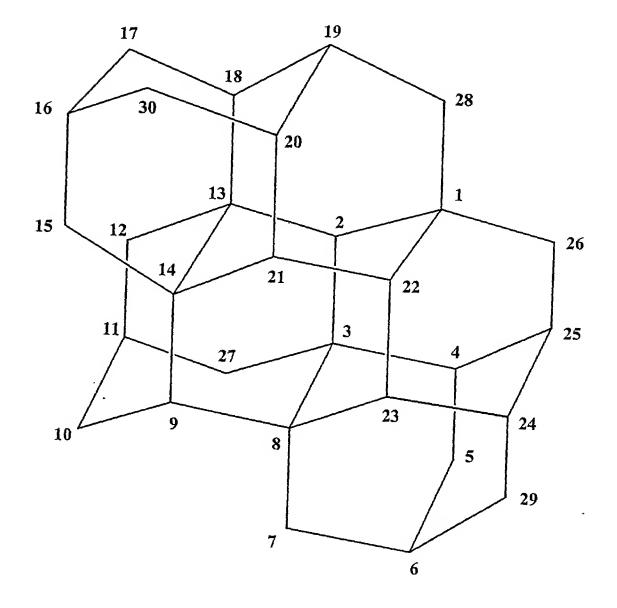
APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 7 of 59

FIG. 2D

#### Hexamantane



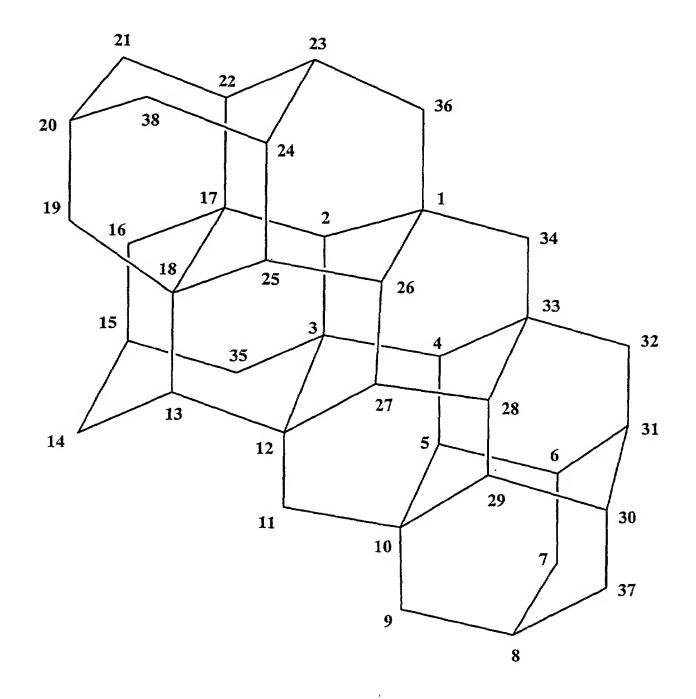
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 8 of 59

FIG. 2E

#### Octamantane



THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED AND ADDRESS O

APPLN. FILING DATE: JANUARY 16, 2002

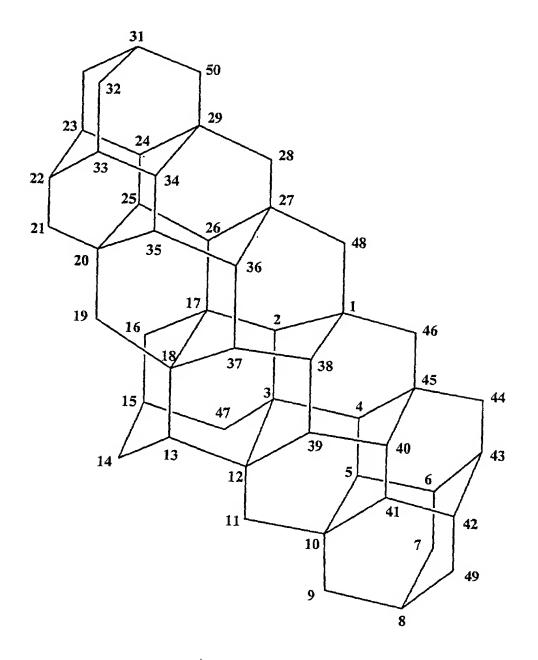
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 9 of 59

FIG. 2F

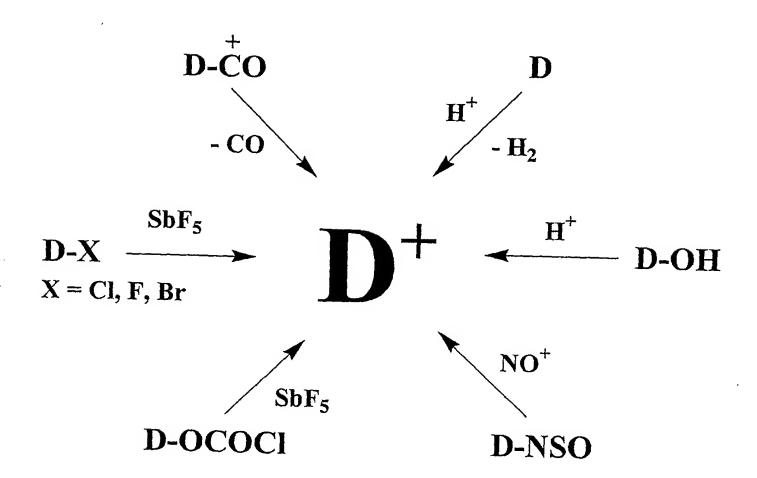
#### Undecamantane



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 10 of 59

FIG. 3A



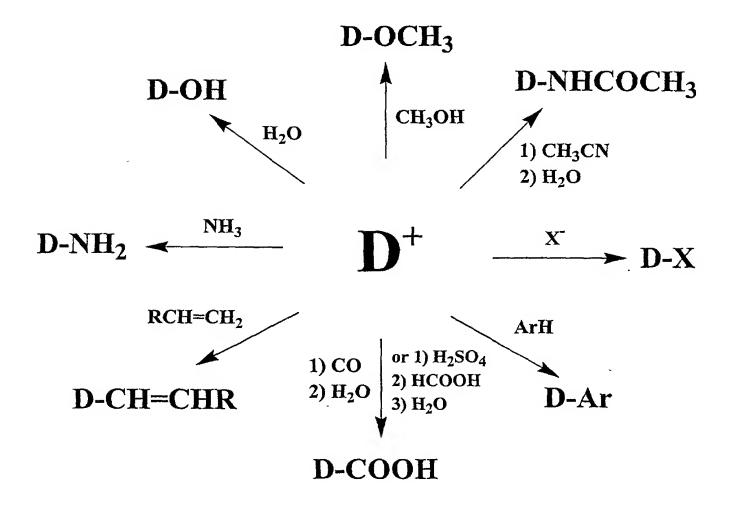
. . . Tunk House

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 11 of 59

FIG. 3B



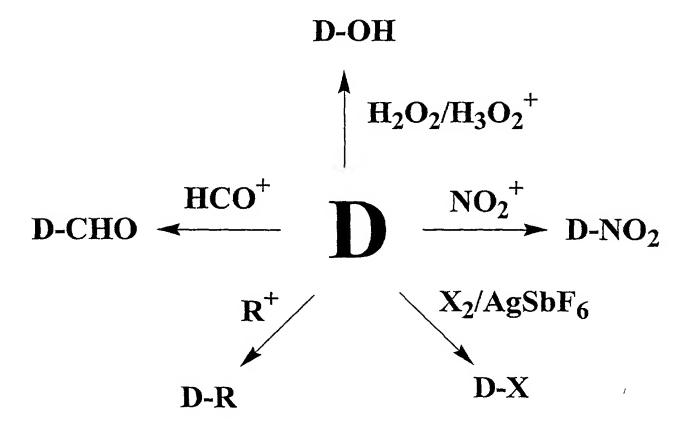
THE RESERVE

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 12 of 59

FIG. 3C



a 144 mal 144 4 1 1 144

· 10000

THE PURE SILE A STREET

APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 13 of 59

FIG. 4B

FIG. 4C

FIG. 4D

$$R^1$$
  $R^2$   
 $n D$   $\longrightarrow$   $R^1 \longrightarrow D \longrightarrow R^2 \longrightarrow R^1 \longrightarrow D \longrightarrow R^2 \dots$ 

FIG. 4E

$$R^{1} R^{2} + m CP \longrightarrow R^{1} - D - R^{2} - CP - R^{1} - D - R^{2} - CP \cdots$$

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 14 of 59

FIG. 4F

FIG. 4G

FIG. 4H

$$2 - \left(CP\right)_{n} + R^{1} R^{2}$$

$$- CP - CP - CP \dots n$$

$$R^{1} R^{1}$$

$$D D$$

$$R^{2} R^{2}$$

$$R^{2} R^{2}$$

$$- CP - CP - CP \dots n$$

constitution outlies to the

.

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 15 of 59

### FIG. 4I

Polyvinyl

monomer

$$CH$$
  $CH_2$   $rep$ 

repeat unit

Further vinyl addition polymers

isobutylene

$$D-CH=C(CH_3)_2$$

repeat unit

acryonitrile

repeat unit

vinylchloride

repeat unit

acrylates

$$CH_2 = C - C - O - D_2$$

monomer

 $H_2C$  repeat unit  $OD_2$ 

the Mile by the section the

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 16 of 59

# FIG. 4I (cont.)

# Further addition polymers

Polyethylene oxide

Polyacetaldehyde

monomer

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 17 of 59

### FIG. 4I (cont.)

#### Condensation polymers

INVENTOR(S): DAHL, ET AL.

**APPLICATION SERIAL NO: FILED HEREWITH SHEET 18 of 59** 

### FIG. 4I (cont.)

#### Condensation polymers (cont.)

Epoxy resins (based on epichlorohydrin - bisphenol A resins)

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 19 of 59

# FIG. 4I (cont.)

# Diamondoid-containing graft polymer

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 20 of 59

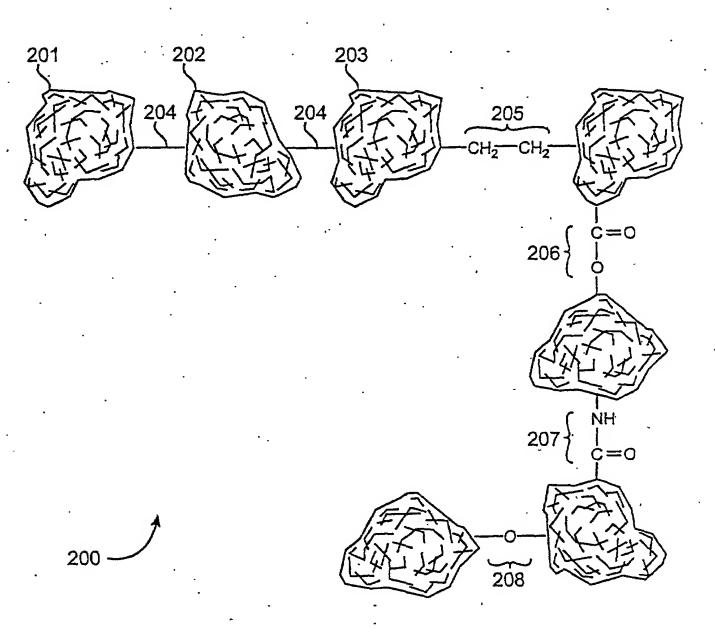


FIG. 5A

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al. Application Serial No: Filed Herewith Sheet 21 of 59

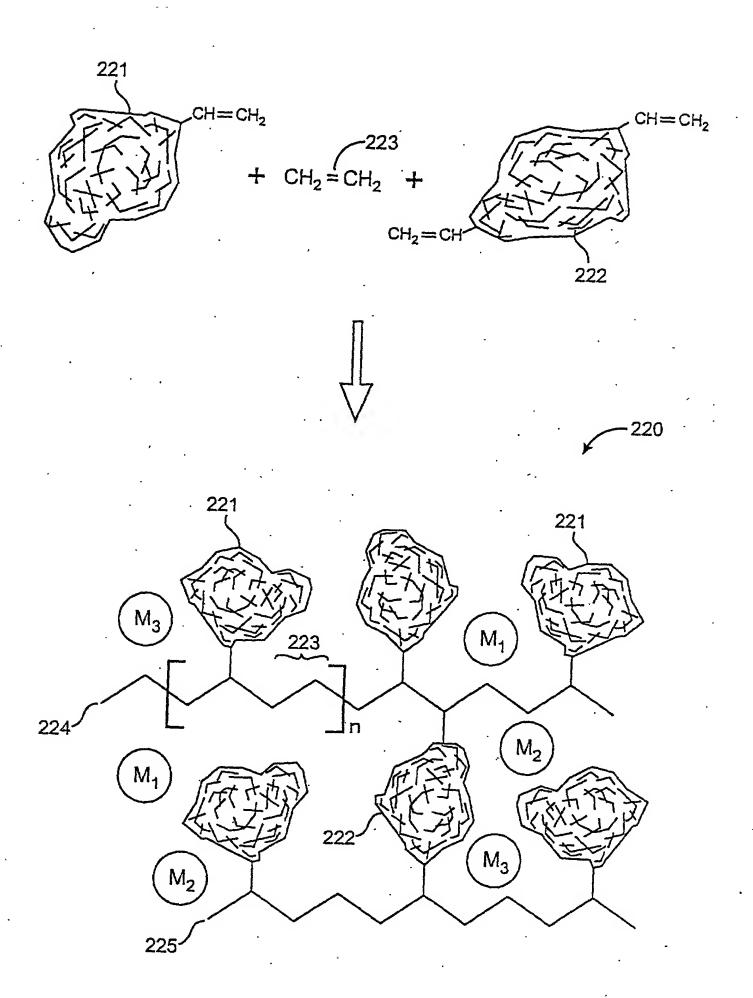


FIG. 5B

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 22 of 59

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 23 of 59

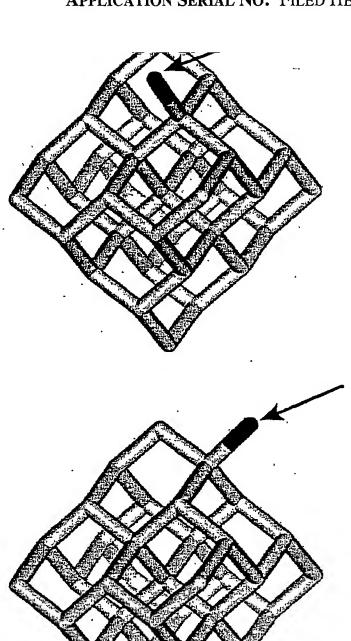


FIG. 5D

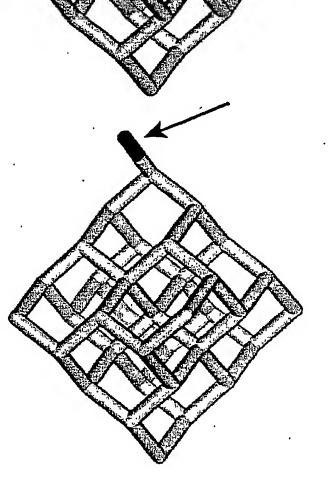
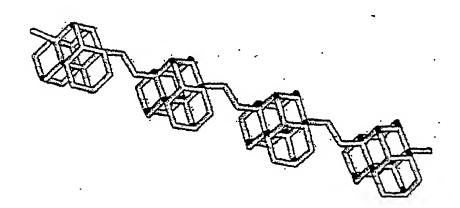


FIG. 5E

FIG. 5F

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 24 of 59



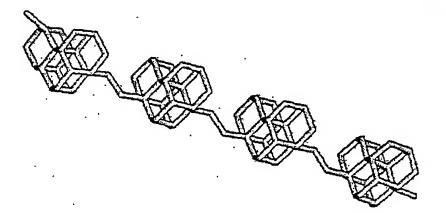


FIG. 5G

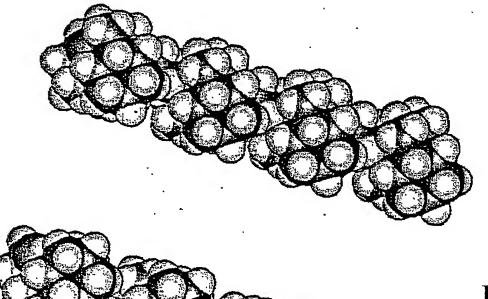


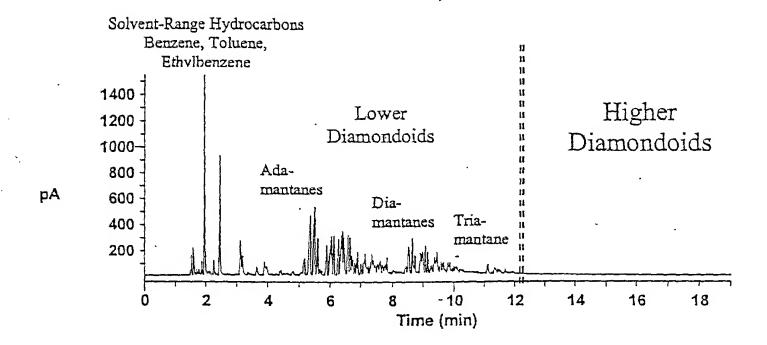
FIG. 5H

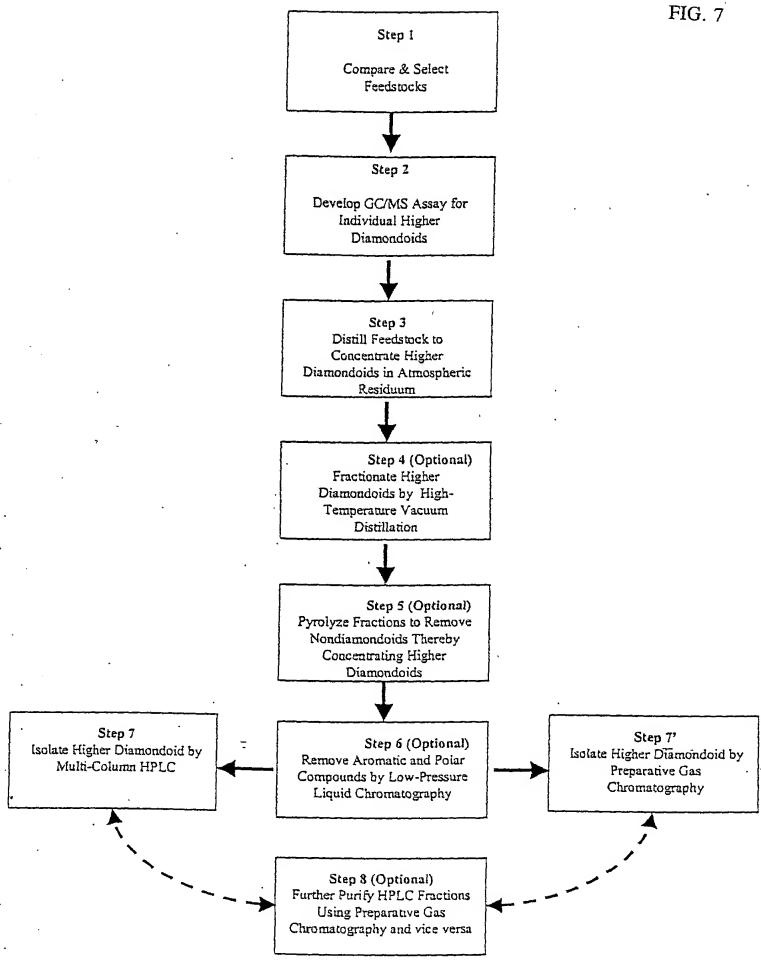
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 25 of 59

FIG. 6





≩:

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 27 of 59

FIG. 8A

	Compound Reference	M+ (m/z) (Equals		GC/MS Relative Retention Times**
Higher Diamondoid	Number	Base Peak)	Times* (min.)	(min.)
Tetramantane #1	4-1	292	8.10	1.00
Tetramantane #2	4-2	292	8.66	1.07
Tetramantane #3	4-3	292	9.12	1.13
Pentamantane #1	5-1	344	10.40	1.28
Pentamantane #2	5-2	344	11.93	1.47
Pentamantane #3	5-3	344	11.98	1.48
Pentamantane #4	5-4	344	12.38	1.53
Pentamantane #5	5-5	344	12.50	1.54
Pentamantane #6	5-6	344	12.71	1.57
Cyclohexamantane	C-6	342	12.34	1.52
Hexamantane #1	6-1	396	14.46	1.78
Hexamantane #2	6-2	396	14.61	1.80
Hexamantane #3	6-3	396	14.97	1.85
Hexamantane #4	6-4	396	14.99	1.85
Hexamantane #5	6-5	396	15.04	1.86
Hexamantane #6	6-6	396	15.13	1.87
Hexamantane #7	6-7	396	15.22	1.88
Hexamantane #8	6-8	396	15.32	1.89
Hexamantane #9	6-9	396	15.42	1.90
Hexamantane #10	6-10	396	15.45	1.91
Hexamantane #11	6-11	396	15.49	1.91
Hexamantane #12	6-12	396	15.54	1.92
Hexamantane #13	6-13	396	15.60	1.93
Hexamantane #14	6-14	396	15.81	1.95
Hexamantane #15	6-15	396	15.89	1.96
Hexamantane #16	6-16	396	16.05	1.98
Hexamantane #17	6-17	396	16.08	1.99
Heptamantane #1	7-1	394	14.96	1.85
Heptamantane #2	7-2	394	15.53	1.92
Heptamantane #3	7-3	448	17.34	2.14
Heptamantane #4A	7-4A	448	17.70	2.18
Heptamantane #4B	7-4B	448	17.70	2.18
Heptamantane #5	7-5	448	17.71	- 2.19
Heptamantane #6	7-6	448	17.79	2.20
Heptamantane #7	7-7	448	17.82	2.20
Heptamantane #8	7-8	448	17.99	2.22
Heptamantane #9A	7-9A	448	18.13	2.24
Heptamantane #9B	7-9B	448	18.13	2.24
Heptamantane #9C	7-9C	448	18.13	2.24
Heptamantane #10	7-10	448	18.15	2.24
Heptamantane #11	7-11	448	18.20	2.25
Heptamantane #12	7-12	448	18.21	2.25
Heptamantane #13A	7-13A	448	18.29	2.26
Heptamantane #138	7-13A 7-13B	448	18.29	2.26
Heptamantane #13C	7-13B	448	18.29	2.26
Heptamantane #14	7-130	448	18.32	2.26
propositional fra	1 1-1-4	770		

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 28 of 59

FIG. 8A cont'd

Higher Diamondoid	Compound Reference Number	M+ (m/z) (Equals Base Peak)	GC/MS Retention Times* (min.)	GC/MS Relative Retention Times** (min.)
Octamantane #1	8-1	446	17.30	2.14
Octamantane #2	8-2	446	17.37	2.14
Octamantane #3	8-3	446	17.42	2.15
Octamantane #4 .	8-4	446	17.47	2.16
Octamantane #5	8-5	446	17.71	2.19
Octamantane #6	8-6	446	17.82	2.20
Octamantane #7	8-7	446	17.86	2.20
Octamantane #8	8-8	446	18.22	2.25
Octamantane #9	8-9	446	18.46	2.28
Octamantane #10	8-10	446	18.65	2.30
Octamantane #11	8-11	446	18.76	2.32
Nonamantane #1	9-1	498	19.86	2.45
Decamantane #1	10-1	456	18.57	2.29
Decamantane #2	10-2	496	21.33	2.63
Undecamantane#1	11-1	508	21.05	2.60

<sup>\*</sup> HP-MS5 (30m X 0.25 mm, 0.25 micron film), helium carrier gas,

<sup>\*\*</sup> Reference to Tetramantane #1

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 29 of 59

FIG. 8B

					Elution	
	Compound		Elution	Elution	Volume	
	Reference	Fraction	Time	Volume	Relative to	
Higher Diamondoid	Number	Number	(min.)	(mL)	4-1	
Tetramantane #1	4-1	4	119	594	1.00	
Tetramantane #2	4-2	7	125	627	1.05	
Tetramantane #3	4-3	6	123	616	1.04	
Pentamantane #1	5-1	11	134	669	1.13	
Pentamantane #2	5-2	19	151	754	1.27	
Pentamantane #3	5-3	28	170	850	1.43	
Pentamantane #4	5-4	22	1-57	786	1.32	
Pentamantane #5	5-5	19	151	754	1.27	
Pentamantane #6	5-6	20	153	765	1.29	
Cyclohexamantane	C-6	23	159	797	1.34	
Hexamantane #1	6-1	33	181	903	1.52	
Hexamantane #2	6-2	29	172	861	1.45	
Hexamantane #3	6-3	43	202	1012	1.70	
Hexamantane #4	6-4	33	181	903	1.52	
Hexamantane #5	6-5	35	185	924	1.56	
Hexamantane #6	6-6	63	242	1211	2.04	
Hexamantane #7	6-7	37	189	945	1.59	
Hexamantane #8	6-8	39	193	967	1.63	
Hexamantane #9	6-9	39	193	967	1.63	
Hexamantane #10	6-10	48	214	1071	1.80	
Hexamantane #11	6-11	36	187	935	1.57	
Hexamantane #12	6-12	44	205	1024	1.72	
Hexamantane #13	6-13	36	187	935	1.57	
Hexamantane #14	6-14	39	193	967	1.63	
Hexamantane #15	6-15	45	207	1036	1.74	
Hexamantane #16	6-16	44	205	1024	1.72	
Hexamantane #17	6-17	49	217	1083	1.82	
Heptamantane #1	7-1	45	207	1036	1.74	
Heptamantane #2	7-2	41	198	989	1.66	
Heptamantane #3	7-3	61	238	1190	2.00	
Heptamantane #4A	_ 7-4A	90	304	1519	2.56	
Heptamantane #4B	7-4B	90	304	1519	2.56	
Heptamantane #5	7-5	76	270	1349	2.27	
Heptamantane #6	7-6	67	251	1253	2.11	
Heptamantane #7	7-7					
Heptamantane #8	7-8	59	234	1172	1.97	
Heptamantane #9A	7-9A	60	236	1181	1.99	
Heptamantane #9B	7-9B	62	240	1200	2.02	
Heptamantane #9C	7-9C	78	274	1370	2.31	
Heptamantane #10	7-10	86	291	1455	2.45	
Heptamantane #11	7-11					
Heptamantane #12	7-12			_		
Heptamantane #13A	7-13A	58	233	1163	1.96	
Heptamantane #13B	7-13B	74	266	1328	2.24	
Heptamantane #13C	7-13C	90	304	1519	2.56	
Heptamantane #14	7-14	70	257	1285	2.16	

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 30 of 59

FIG. 8B cont'd

Higher Diamondoid	Compound Reference Number	Fraction Number	Elution Time (min.)	Elution Volume (mL)	Elution Volume Relative to 4-1
Octamantane #1	8-1	81	280	1402	2.36
Octamantane #2	8-2	83	285	1423	2.40
Octamantane #3	8-3	64	244	1221	2.06
Octamantane #4	8-4				
Octamantane #5	8-5	63	242	1211	2.04
Octamantane #6	8-6	79	276	1381	2.32
Octamantane #7	8-7	71	259	1296	2.18
Octamantane #8	8-8	84	287	1434	2.41
Octamantane #9	8-9	74	266	1328	2.24
Octamantane #10	8-10	80	280	1402	2.36
Octamantane #11	8-11	85	289	1445	2.43
Nonamantane #1	9-1	89	297	1487	2.50
Decamantane #1	10-1	83	285	1423	2.40
Decamantane #2	10-2				
Undecamantane#1	11-1	101	355	1774	2.99

ODS HPLC Whatman ODS-II 10/50

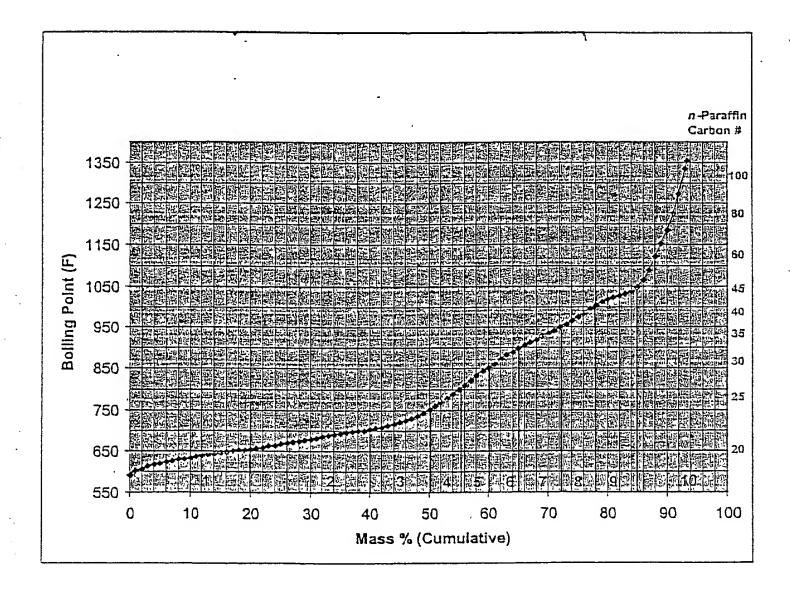
(2 Columns in series), acetone mobile phase @5.0 mL/min.

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 31 of 59

FIG. 9



er njugangravare er egya er sameras

**INVENTOR(S):** DAHL, ET AL.

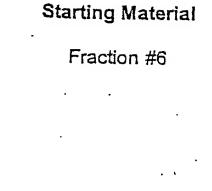
APPLICATION SERIAL NO: FILED HEREWITH SHEET 32 of 59

Distillation Cuts Made on Atmospheric Resid of Feedstock B (°C)	[601- 656] 656- 702  702- 752  752- 800  800- 852  852- 900  900- 9501 950- 976   976   976		公本的程序系 是数据设置的 有话中国的程序 1200年的中国 1000年的 10000年的 1000年的 1000年的 1000年的 1000年的 1000年的 1000年的 1000年的 1000年的 1000	tanes	mantanes	anes	fanes	anes	anes	anes	HIGHOSPHAN AND AND AND AND AND AND AND AND AND A
		Higher Diamondoid	Tetramantanes	Pentamantanes	Cyclohexamantanes	Hexamantanes	Heptamantanes	Octamantanes	Nonamantanès	Decamantanes	ondecamantanos

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al.
Application Serial No: Filed Herewith Sheet 33 of 59

FIG. 11A



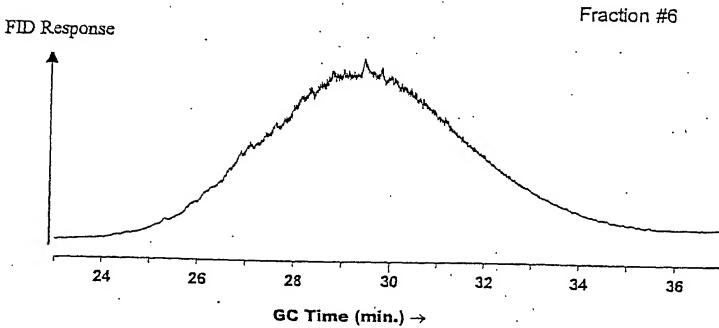
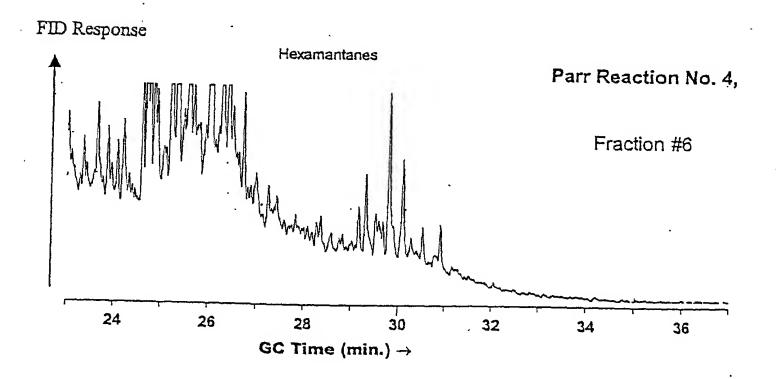


FIG. 11B



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 34 of 59

FIG. 12A

						He	xan	rer	tan	e											•
CDS HPLC								-										Fully		•	
Fraction							-										}	Condensed			
· #	1	2	3	4	5	6	7	8	9	10	44	12	13	14	15	16	17	Hexamentane			
	-		-	7	<u> </u>	-	-	Ĭ	-	<u></u>			<u></u>	-	<u> </u>						
23																					
24			_																		
25																					
26									_												
27		يوسون الدونونيور										-									
28											-			_					Hex 2		
29		X																	. 222		
30											├-										
31	-					├				-	┢┈										
32				i X				<del> </del>			-								Hex 1	Hex 4	
	₩X.	大学					-				├-	-									
34	-	-			x	$\vdash$	-	-		<del>                                     </del>		-							Hex 5		
35	-				-	-	機器				X		X						Hex 11	Hex 13	-
	-		-		-	-	X		-	-									Hex7		
37	-	-	-			-	熱		經歷	_							-				
39		-		-		+	82.64.25		X				E-03-2	X		-			Hex 8	Hex9	Hex 14
40	╁	<del>                                     </del>	<del>                                     </del>	<u> </u>	╁	+-					B-See			100			<u> </u>		1		
41	十			-	$\vdash$	+-					$\dagger$		<u> </u>	<b>高端</b>							
42	+-								a) Middle	1	$\vdash$	$\vdash$	<b> </b>								
43	T		×			1					1	Ą to				殿司			Hex 3		
44	-						1				1					#X			Hex 12	Hexa 16	
45	<del>                                     </del>														X				Hex 15		
46	1																•		1		
47															NA.	1					
48						1										<u> </u>			Hex 10		
49																	MX.		Hex 17		
50														_	<u> </u>						
51												士							4		
52						1	1	<u> </u>		<del> </del>									4		
61							1										<u> </u>		4		
62						巅									<u> </u>	<del>                                     </del>	ļ	<u> </u>	-		
ස						X						↓_			_	<del> </del>	1-		Hex 6		
64				<u> </u>								1_		_		-	<del> </del>		-		
65							2														

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 35 of 59

FIG. 12B

•												-							
Hypercarb			$\neg$					1										Fully	
HPLC Fraction							1											Condensed	
#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Hexamantane	
1																			
2										-									
3																			
4																			
3																			
26																			
27													TX.						Hex 13
				<del>                                     </del>	1	<del>                                     </del>							變				•		
28					-						-		Phary (92%)	X					Hex 14
29			-		-	├					_		-	推新					Hex 1
	X			-	┼	╀╌	-						-	翻線					Hex 10
31				<del> </del>	-	-			-		(1)		-	部計					Hex 11
32			<del>                                     </del>		-	<del> </del>	_	-	-		×		-	a del Cit	<b></b> -				1
33				-	-	<del>!</del>	<del> </del>	-						<del> </del>					1
34			-	├	┼—	-	-	-	├──			-	-	$\vdash$					1
35			<u> </u>	<u> </u>	$\vdash$	-		-			C/G-C34(t								1
43				1															1
44				1		X			П		·			<u> </u>					Hex 6
45					1											<u> </u>			4
46																ļ			4
47					1						T					<u> </u>			4
48					T	1	T							<u> </u>	<u> </u>				۱., هم
49		T .				·			高楽				1		<u> </u>	医XX能			Hex 15
50									影 <b>X</b>	2						<b>3</b>			Hex 9
51						T				1		1							1
52	-		<u> </u>		1	1		1						T					1
53			4	-		+	+-	+	1	1	+-	1	+	1					]
	_	THE PARTY	4	+	+	+-	+-	+-	+	<del> </del>	+	+	1	1					Hex 2
34	<del></del>	X		+		-		-	-	┼─		+-		+	+	-			-
55					┿-		╀	<del> </del>	-	1			+-	+	-	+			1
56		The state of	3		-	-	-	┼-	-	-			+	+-	+	<del> </del>	-		1
57	7	解網	Š		-			<del> </del> -	<b></b>	┦	┼	╬			+-	-	-	-	1
58	3	語語	4						<u> </u>						<del>  </del>		<b>↓</b>		-
59	3	語語語	,									1							4
60			284	1	1	$\top$		$\top$									ļ		4
6	-	1207	i.					1									<u> </u>	· ·	_
6:		Martine of Augh	+		1	$\top$	1	1											4
7:			1	+	1	1		ğ.	1	1									_
7			T	1-	+-	$\top$	67.50			1	1	$\top$							_
7.		-	+	1	1-	$\dashv$	) X		1	1	1	$\top$							<b>-</b>   =
- 7			+	+	1	$\top$			+	$\top$									Hex 7
7		+	+-	1	$\top$	1		ni.	1		$\top$								4
7				$\dashv$		$\top$													
7			1		_	十	1	-									1		=
8			+	+=	1	干	+	T						1	1				
0	<u> </u>	i																	

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 36 of 59

FIG. 13A

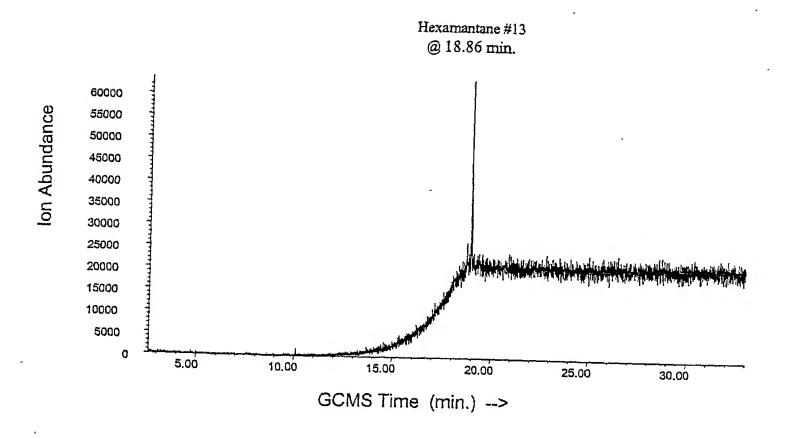
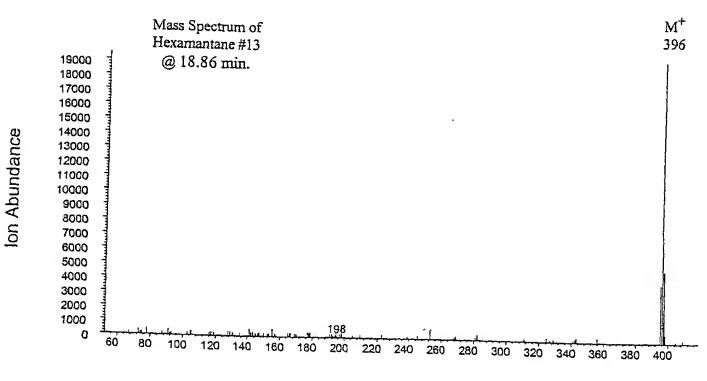


FIG. 13B



m/z-->

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 37 of 59

FIG. 14A

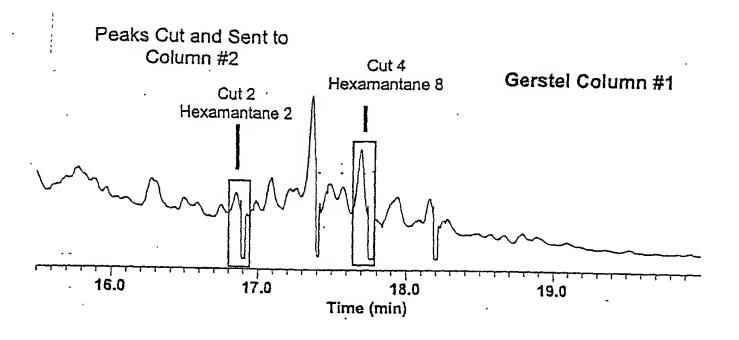
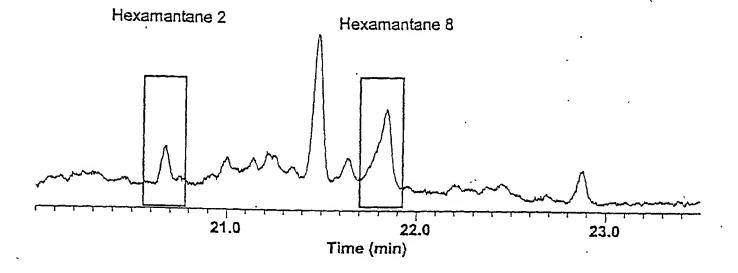


FIG. 14B

Peaks Sent to Traps
Where Crystals of Hexamantane #2 (trap 1)
and #8 (trap 3) formed

Gerstel Column #2



Ion Abundance

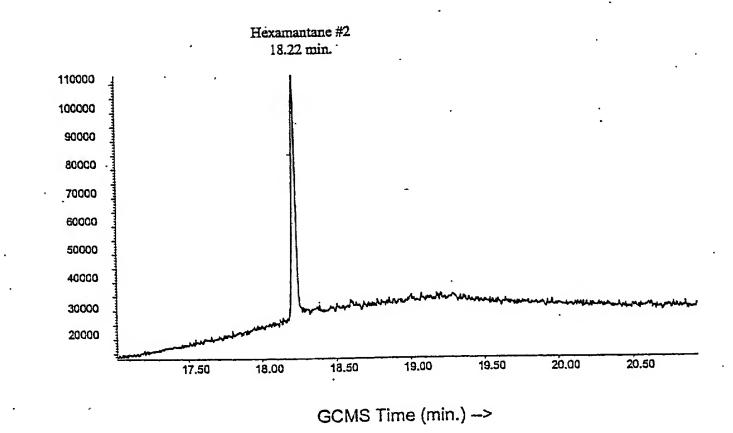
APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 38 of 59

FIG. 15A



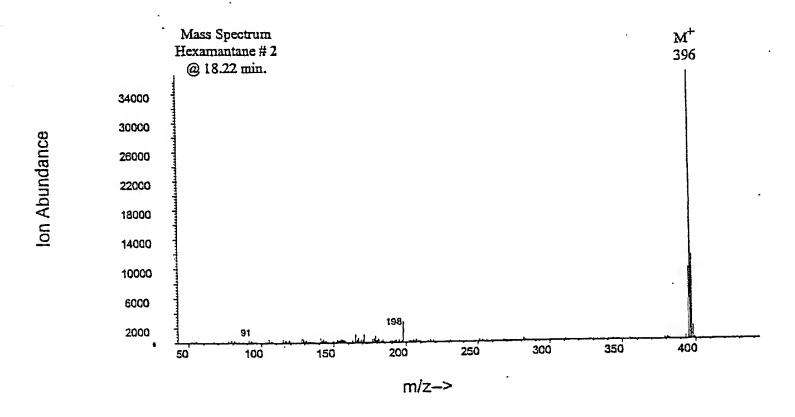


FIG. 15B

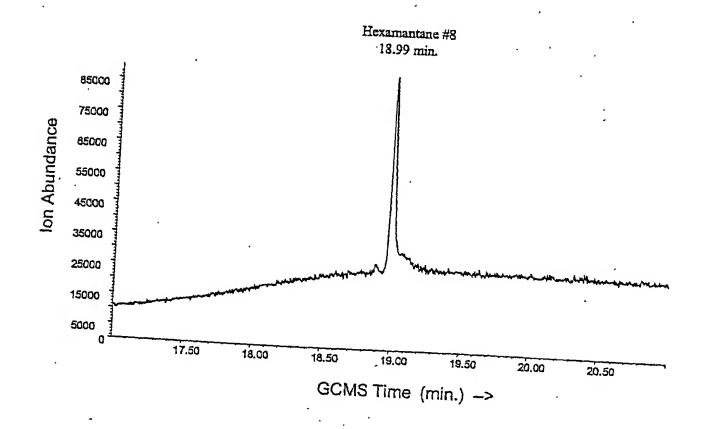
AND THE PARTY OF T

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 39 of 59

FIG. 15C



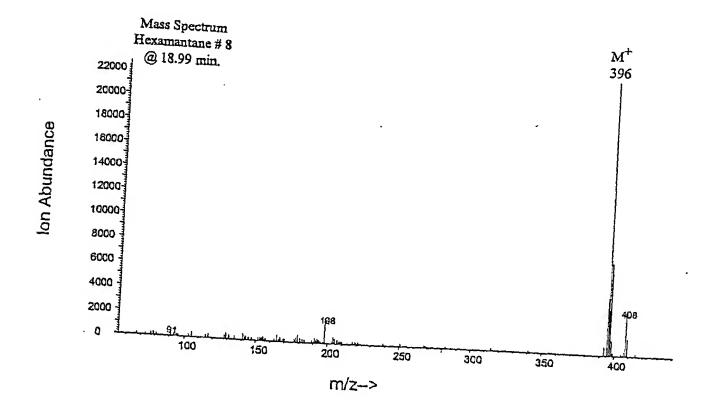


FIG. 15D.

ranju ii rimanogua kur er er er ritt iri

THE PHER HELD A SERVEN

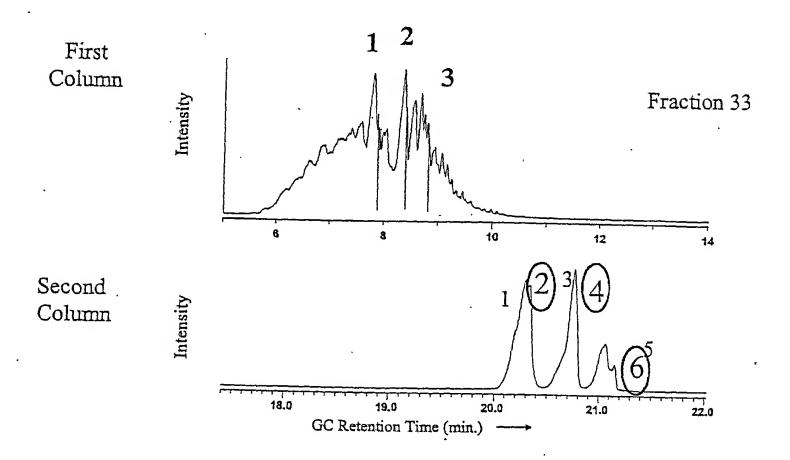
APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 40 of 59

FIG. 16



n germ

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 41 of 59

FIG. 17

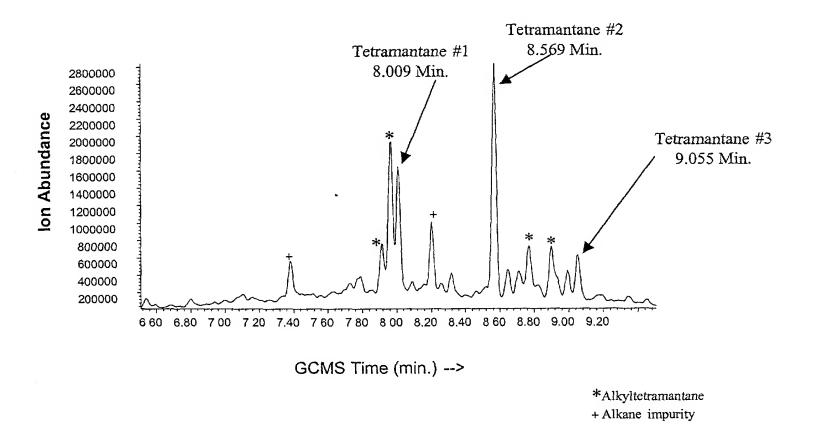
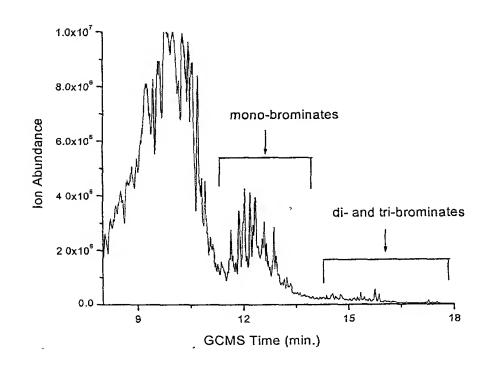


FIG. 18

TIC of Bromination Products of a Feedstock Containing a Mixture of Tetramantanes and Alkyltetramantanes



e na cilia e la labita que

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 42 of 59

FIG. 19

TIC of Mono-brominated Products

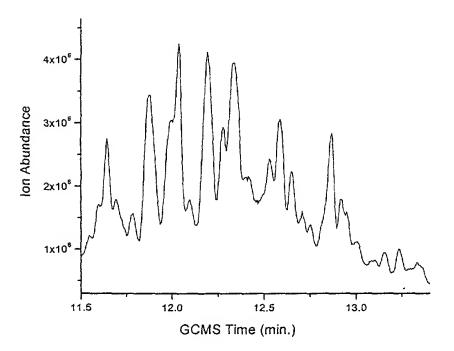
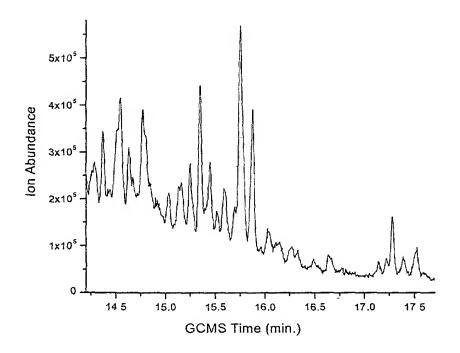


FIG. 20

TIC of Di- and Tri-brominated Products



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 43 of 59

FIG. 21

GC of a Mono-brominated Tetramantane (\*, 12.038 min.)

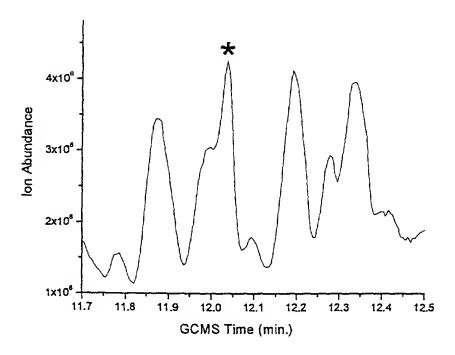
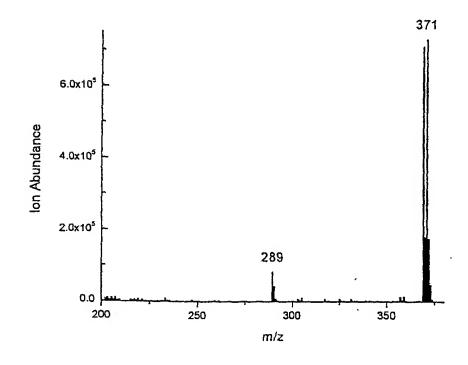


FIG. 22

GCMS of the Mono-brominated Tetramantane @ 12.038 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 44 of 59

FIG. 23

GC of Mono-brominated Methyltetramantanes (\*, 11.644 and 11.992 min.)

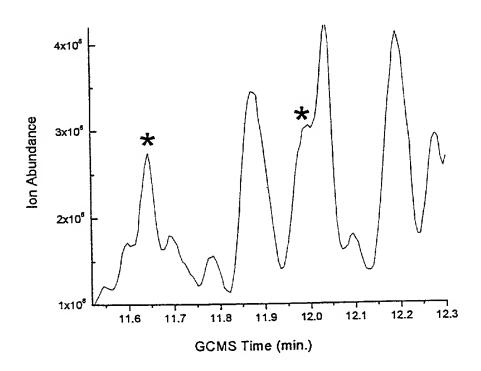
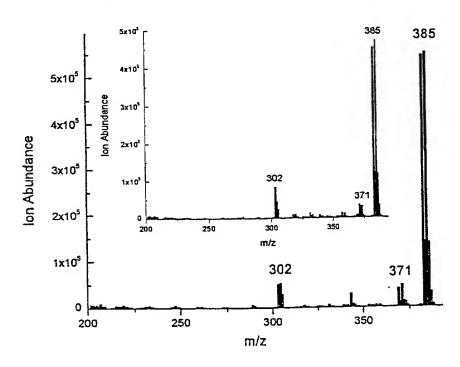


FIG. 24

GCMS of the Monobrominated Methyltetramantanes @ 11.644 (inset) and 11.992 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 45 of 59

FIG. 25

GC of a Mono-brominated Dimethyltetramantane (\*, 12.192 min.)

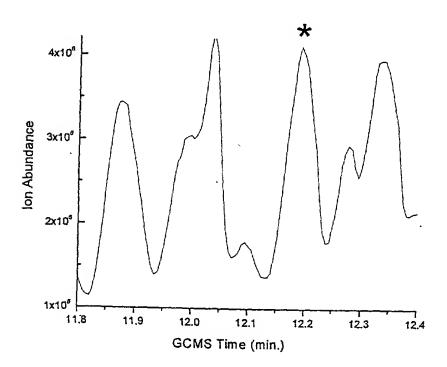
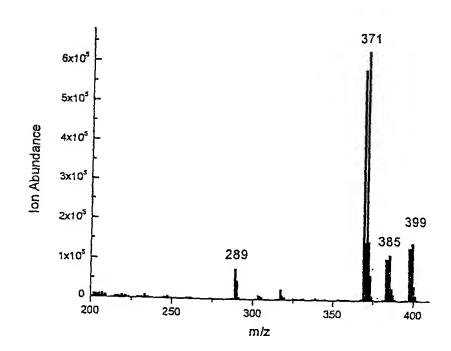


FIG. 26

GCMS of the Monobrominated Dimethyltetramantane @ 12.192 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 46 of 59

FIG. 27

GC of a Di-brominated Tetramantane (\*, 15.753 min.)

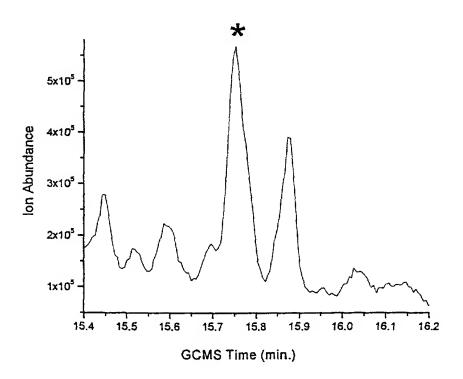
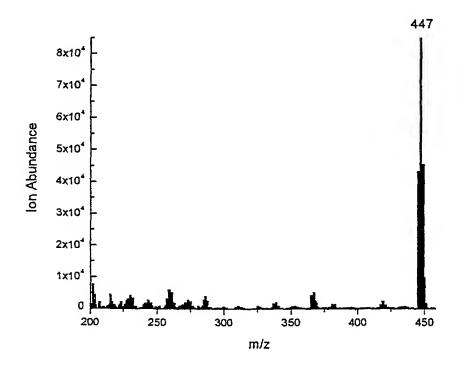


FIG. 28

GCMS of the Di-brominated Tetramantane @ 15.753 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 47 of 59

FIG. 29

GC of a Di-brominated Methyltetramantane (\*, 15.879 min.)

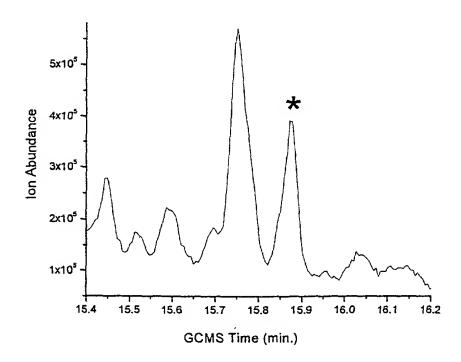
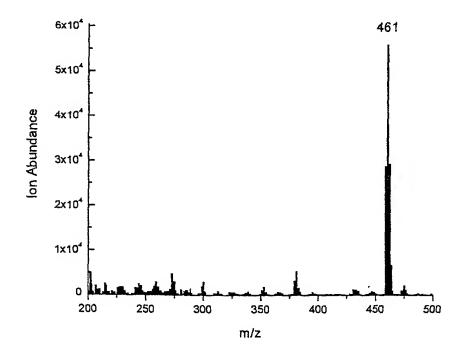


FIG. 30

GCMS of the Di-brominated Methyltetramantane @ 15.879 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 48 of 59

FIG. 31

GC of a Tri-brominated Tetramantane (\*, 17.279 min.)

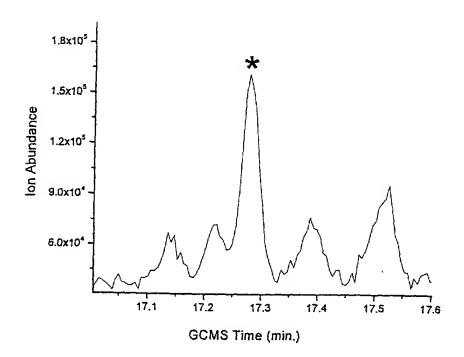
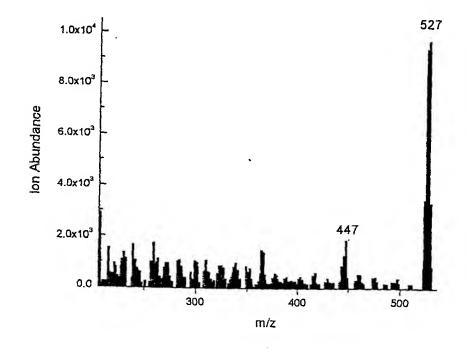


FIG. 32

GCMS of the Tri-brominated Tetramantane @ 17.279 min.



TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 49 of 59

FIG. 33

GC of a Tri-brominated Methyltetramantane (\*, 15.250 min.)

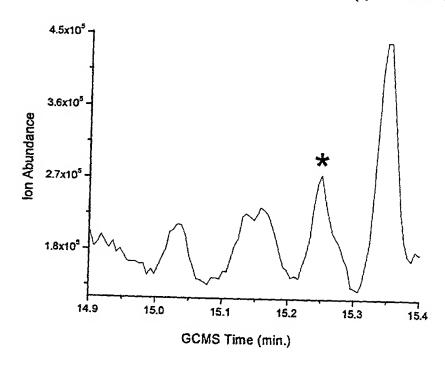
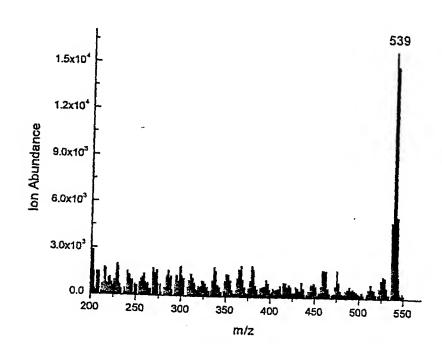


FIG. 34

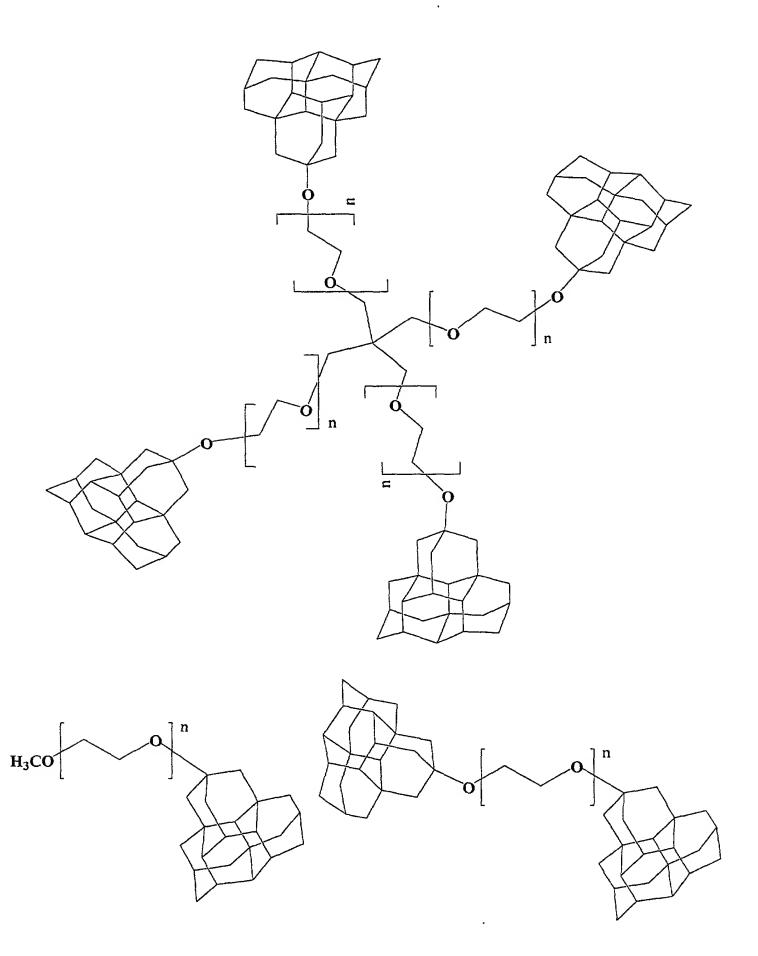
GCMS of the Tri-brominated Methyltetramantane @ 15.250 min.



conformation of marin

APPLN. FILING DATE: JANUARY 16, 2002
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES
INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 50 of 59

FIG. 35



in the second

APPLN. FILING DATE: JANUARY 16, 2002

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 51 of 59

FIG. 36

APPLN. FILING DATE: JANUARY 16, 2002
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 52 of 59

## **FIG. 37A**

## Aromatic bisphenols: HO-Ar-OH

Ar:

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

**APPLICATION SERIAL NO: FILED HEREWITH SHEET 53 of 59** 

FIG. 37B

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

**INVENTOR(S):** DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 54 of 59

FIG. 38

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

Inventor(s): Dahl, et al.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 55 of 59

FIG. 39A

APPLN. FILING DATE: JANUARY 16, 2002
TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 56 of 59

FIG. 39B

## Aromatic Dianhydride

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.

APPLICATION SERIAL NO: FILED HEREWITH SHEET 57 of 59

FIG. 40

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 58 of 59

FIG. 41

The transfer of the transfer o H That with The state of the s

TITLE: POLYMERIZABLE HIGHER DIAMONDOID DERIVATIVES

INVENTOR(S): DAHL, ET AL.
APPLICATION SERIAL NO: FILED HEREWITH SHEET 59 of 59

FIG. 42

Aromatic diamines: H<sub>2</sub>N-Ar-NH<sub>2</sub>

Ar: